

Name: _____

at1118paper: Complete the Square (v420)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 60x = -576$$

Add $(\frac{-60}{2})^2$, which equals 900, to both sides of the equation.

$$x^2 - 60x + 900 = 324$$

Factor the left side.

$$(x - 30)^2 = 324$$

Undo the squaring. We need to consider both $\pm\sqrt{324}$.

$$x - 30 = -18$$

or

$$x - 30 = 18$$

$$x = -48$$

or

$$x = -12$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 32x = -240$$

$$x^2 - 32x + 256 = 16$$

$$(x - 16)^2 = 16$$

$$x - 16 = \pm 4$$

$$x = 12 \quad \text{or} \quad x = 20$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 46x = -273$$

$$x^2 + 46x + 529 = 256$$

$$(x + 23)^2 = 256$$

$$x + 23 = \pm 16$$

$$x = -39 \quad \text{or} \quad x = -7$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 46x = 627$$

$$\begin{aligned}x^2 - 46x + 529 &= 1156 \\(x - 23)^2 &= 1156 \\x - 23 &= \pm 34 \\x = -11 &\quad \text{or} \quad x = 57\end{aligned}$$

Question 4

By completing the square, find both solutions to the given equation:

$$x^2 - 18x = 88$$

$$\begin{aligned}x^2 - 18x + 81 &= 169 \\(x - 9)^2 &= 169 \\x - 9 &= \pm 13 \\x = -4 &\quad \text{or} \quad x = 22\end{aligned}$$

Question 5

By completing the square, find both solutions to the given equation:

$$x^2 + 18x = 1008$$

$$\begin{aligned}x^2 + 18x + 81 &= 1089 \\(x + 9)^2 &= 1089 \\x + 9 &= \pm 33 \\x = -42 &\quad \text{or} \quad x = 24\end{aligned}$$

Question 6

By completing the square, find both solutions to the given equation:

$$x^2 + 30x = -104$$

$$\begin{aligned}x^2 + 30x + 225 &= 121 \\(x + 15)^2 &= 121 \\x + 15 &= \pm 11 \\x = -26 &\quad \text{or} \quad x = -4\end{aligned}$$